M E M O R A N D U M

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TO: IEA Annex 23 OC^3 Participants

CC:

FROM: Tim Camp, Garrad Hassan

SUBJECT: **Wave Kinematics & Surface Elevation Data for 45m tripod**

This note describes the format of the wave kinematics and surface elevation data supplied to the OC^3 participants for the 45m tripod test case.

For these load cases, the mean water depth is taken to be 45m.

A reference frame is chosen such that x and y axes lie in a horizontal plane. The x-axis points in the direction of wave propagation, while the y-axis is perpendicular to the direction of wave propagation. The z-axis points vertically upwards and has its origin at the mean water level (MWL). Thus the sea bed has a z-coordinate of -45m.

The accompanying datasets specify the time histories of surface elevation and water particle kinematics for each of the above three cases. The data is supplied in two datasets:

- "surface.txt" contain surface elevation time history data
- "kinematics.txt" contain water particle kinematics time history data

The formats of these files are the same as provided for earlier test cases. An additional spreadsheet file is included: "format.xls" which specifies this format.

The water particle kinematics is specified in terms of:

- Water particle x-velocity
- Water particle y-velocity (always zero in these cases)
- Water particle z-velocity
- Water particle x-acceleration
- Water particle y-acceleration (always zero in these cases)
- Water particle z-acceleration
- Dynamic pressure

The above parameters are specified at 71 points along a vertical line (aligned with the centreline of the turbine tower). These points are spaced at intervals of 1.0m between -45.0m (sea bed) and -15.0m and at intervals of 0.5m between -15.0m and +5.0m. Values are specified at time intervals of 0.1s for one wave period (10s).

Simulations should be run for 30s. At 0s, the crest of one wave is positioned on the tower centreline. For subsequent times and for positions in the 'up-wave' and 'down-wave' directions, the wave data must be accessed at a 'pseudo-time':

$$t' = t - \frac{x}{c}$$

where c is the group velocity which, in this case, equals 15.310m/s.

If there are any queries about the derivation or format of this data, please don't hesitate to contact me by email (tim.camp@garradhassan.com) or telephone (+44 117 972 9929).